I CLAIM:

1. A bandpass filter comprising at least one cavity with said at least one cavity having a cut resonator therein, said cavity having at least one wall and said resonator being out of contact with said at least one wall.

2. A filter as claimed in Claim 1 wherein said cavity has a half cut resonator located therein.

3. A filter as claimed in Claim 2 wherein said resonator is a conductor-loaded resonator.

4. A filter as claimed in Claim 3 wherein the cavity has a rectangular shape and said resonator is planar mounted.

5. A filter as claimed in Claim 4 wherein said resonator has a modified shape.

6. A filter as claimed in Claim 5 wherein said modified shape has at least one cut away portion.

7. A filter as claimed in Claim 5 where said modified shape has at least a first cut away portion and a second cut away portion.

8. A filter as claimed in Claim 5 wherein said resonator has a semicircular shape with one straight edge and a first cut away portion having a rectangular shape and being substantially centrally located in said straight edge.

9. A filter as claimed in Claim 8 wherein said resonator has a substantially arcuate edge and second cut away portion having a rectangular shape that is substantially centrally located in said arcuate edge.

10. A filter as claimed in Claim 9 wherein said resonator wherein said second cut away portion is larger than said first cut away portion.

11. A filter as claimed in Claim 5 wherein the modified shape of said resonator is cut away portions in specific areas to improve spurious performance.

12. A filter as claimed in Claim 3 wherein said resonator is made from superconductive material.

13. A filter as claimed in Claim 3 wherein said conductor-loaded resonator is used in combination with at least one dielectric resonator.

14. A filter as claimed in Claim 3 wherein said filter has at least two cavities, there being a conductor-loaded resonator in one of said at least two cavities and a dielectric resonator in the other of said at least two cavities.

15. A filter as claimed in Claim 5 wherein there are at least two conductor-loaded resonators located in said at least one cavity to create a dual mode conductor-loaded cavity resonator with improved spurious performance.

16. A filter as claimed in Claim 13 wherein said filter has eight cavities, a first cavity and a last cavity containing conductor loaded resonators and the remaining cavities containing dielectric resonators.

17. A filter as claimed in Claim 13 wherein said filter has eight cavities, a first, second and third cavity each containing a conductor-loaded resonator and the remaining cavities containing dielectric resonators.

18. A filter as claimed in Claim 2 wherein said at resonator has a mode selected from the group of a single mode and a dual mode.

19. A filter as claimed in Claim 3 wherein said conductor-loaded resonator is made from a material selected from the group of metallic, superconductive, thick film superconductive and single crystal.

20. A filter as claimed in Claim 3 wherein said resonator is made from copper.

21. A microwave cavity having at least one wall, said cavity comprising a cut resonator located therein, said resonator being out of contact with said at least one wall.

22. A cavity as claimed in Claim 21 wherein said cavity has a half-cut resonator located therein.

23. A cavity as claimed in Claim 22 wherein said resonator is a conductor-loaded resonator.

24. A cavity as claimed in Claim 23 wherein said cavity has a rectangular shape and said resonator is planar or mounted.

25. A cavity as claimed in Claim 24 wherein said resonator has a modified shape.

26. A cavity as claimed in Claim 25 wherein said modified shape has at least one cut away portion.

27. A cavity as claimed in Claim 25 wherein said modified shape has at least a first cut away portion and a second cut away portion.

28. A cavity as claimed in Claim 25 wherein said resonator has a semicircular shape with one straight edge and a first cutaway portion having a rectangular shape and being substantially centrally located in said straight edge.

29. A cavity as claimed in Claim 25 wherein said resonator has a substantially arcuate edge and a second cut away portion having a rectangular shape that is substantially centrally located in said arcuate edge.

30. A cavity as claimed in Claim 28 wherein said resonator has an arcuate edge and a second cut away portion having a rectangular shape that is substantially centrally located in said arcuate edge.

31. A cavity as claimed in Claim 24 wherein said resonator is made from metal.

32. A cavity as claimed in Claim 25 wherein the modified shape of said resonator are cut away portions in specific areas to improve spurious performance.

33. A filter as claimed in Claim 23 wherein said resonator is made from superconductive material.

34. A cavity as claimed in Claim 23 wherein said conductor loaded resonator is used in combination with at least one dielectric resonator.

35. A cavity as claimed in Claim 25 wherein there are at least two conductor loaded resonators located in said cavity to create a dual mode conductor-loaded cavity resonator with improved spurious performance.

36. A cavity as claimed in Claim 23 wherein said conductor loaded resonator is made from a material selected from the group of metallic, superconductive, thick film superconductive and single crystal.

37. A cavity as claimed in Claim 23 wherein said resonator is made from copper.

38. A method of improving the spurious performance of a bandpass filter, said method comprising locating a cut resonator in at least one cavity of said filter, said cavity having at least one wall and said resonator being located out of contact with said at least one wall.

39. A method of improving the spurious performance of a bandpass filter said method comprising locating a conductor-loaded cut resonator in at least one cavity of said filter, said cavity having at least one wall and said resonator being located out of contact with said at least one wall.